

NISS Parameters

A quarterly newsletter from the National Institute of Statistical Sciences



NISS at Twenty: A Look Back at Our Past - Part 2

NISS spent its early days in a handful of offices that were donated by the Research Triangle Institute (now RTI International). Jerome (Jerry) Sacks became the first Director in 1991, and, in what he called “one of my best moves as Director,” hired Martha Williamson as administrative assistant. In 1992, Alan Karr joined NISS as the Associate Director.

The first large-scale NISS project, **Statistical Strategies for Monitoring and Assessing Environmental Changes and Effects**, was funded by the US EPA. Soon, NISS was interacting with multiple federal government agencies. The second major project was **Measurement, Modeling and**

NISS

Celebrating 20th year of NISS

2010

10th year of affiliates program

Prediction for Infrastructural Systems with \$6 million in support over five years from the Mathematical/Physical Sciences and Engineering Directorates of the National Science Foundation (NSF).

“I think it was perhaps the transportation project that was really the first major success that NISS had on the research side that we could point to and say, ‘Look, this is something that would not have happened without NISS’, that is, no individual academic institution would have been able to put together a project of that scale with those resources,” said Dan Solomon, member of the Board of Trustees of NISS and Dean of the College of Physical and Mathematical Sciences at North Carolina State University.

From the beginning, NISS research and the NISS postdoctoral program have been inseparable. The first postdoctoral fellows were appointed in 1993, funded by both project and NSF funds for institute-wide postdoctoral fellowships. The first cohort was comprised of Feng Gao, Nancy McMillan, Laura Steinberg, Patricia Styer, Valerie Williams and Haibo Zhou.

Another major project that started in 1993, **Analysis, Exploration and Inference in Large Educational Data Sets** began a relationship with the National Center for Education Statistics (NCES) that has continued through the years and is stronger

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L-R: Dan Solomon (NCSU), Alan Karr (NISS), Jerry Sacks (NISS) and Claude McKinney (TUCASI) at the NISS groundbreaking in March, 1997.



Lt. Governor Dennis Wicker at the NISS building dedication

From the Director

Over the next two years NISS and SAMSI will both undergo significant transitions.

On the SAMSI side, in July of this year, Richard Smith, Mark L. Reed III Distinguished Professor of Statistics and Operations Research at UNC Chapel Hill, replaces Jim Berger as director of SAMSI. The entire statistical sciences community owes Jim its deepest thanks for



his extraordinary work in bringing SAMSI from dream to reality. Richard's achievements as director will be different, but I expect them to be equally dramatic, starting with a blockbuster proposal to renew SAMSI's NSF funding for 2012-2017. I and everyone else at NISS will be supporting Richard in this effort.

At NISS, the changes are equally profound. Starting in January of this year, Nell Sedransk has been transitioning from her current North Carolina base to a Washington DC base, a process that will be complete in the summer of 2011. This will provide us a senior leadership presence in DC that has been sporadic to date, strengthening relationships with affiliates and other organizations there, as well as with our now-5-and-expected-to-grow set of employees and postdocs based in the DC area.

This summer, we will initiate a search for a full-time senior

leader to be based at NISS, who will work with Nell, me and our assistant directors to further develop our research portfolio, to solidify and deepen the NISS-SAMSI relationship, and to help us move in the direction of attracting foundation as well as funding agency and corporate support for NISS research. We expect that this person will be in place (and of course very active!) at NISS by July of 2011. An accompanying university appointment is possible, but our net is cast widely, and we welcome suggestions and expressions of interest from academia, government and industry.

Finally, on June 1 of this year, a distinguished statistician will join NISS as assistant director, complementing Stanley Young's role as assistant director for bioinformatics. So by July 1, 2011, we will be a leadership team of 5! Nothing that has happened recently at NISS excites me more.

Alan Karr
Director

Calendar of Events

ITSEW 2010

The Ongoing Evolution of Survey Methodology and the Impact on Total Survey Error
June 13-16, 2010
Stowe, VT
NISS Co-Sponsored
ARA eligible

Workshop on Syndromic Surveillance

June 27-28, 2010, at NISS.
ARA eligible

JSM Affiliates Meeting

Saturday, July 31, 2010, from 3 to 6 PM, in Vancouver, BC

NISS/SAMSI JSM Reception

Monday, August 2, 2010 from 5 to 7 PM, in Vancouver, BC

Updates from Former Postdocs

Vincent Granville, Ph.D., former postdoc at NISS, has accepted the position of Chief Scientist at LookSmart, Ltd. LookSmart is an online search advertising solutions company. In this newly created role, Granville leads LookSmart's internet traffic optimization initiative, with the goal of increasing the overall performance of the Ad Network for the benefit of both its publisher and advertiser bases.

Photos From: Affiliates Annual Meeting



L-R: Alan Karr, NISS; Kenneth Koehler-Iowa State U. and Roy Whitmore-RTI International.



Bruce Spencer, Northwestern University, listens intently to the speaker during Survey Day.



Roy Whitmore-RTI International looks at the individual screens in the board room at NORC.



An overview shot of the board meeting room at NORC.



John Eltinge of Bureau of Labor Statistics talks about survey costs.



Sunshine Hillygus-Duke U. and Bob Rodriguez-SAS Institute.

Former Postdoc Profile:

Jeff Picka

Former NISS postdoc Jeff Picka dropped by the NISS offices in Research Triangle Park and gave *NISS Parameters* an update on his research. Picka worked for NISS in 1996-99 on the transportation project. He was based at Northwestern University, studying the durability of concrete. He developed spatial models that were used by the Center for Advanced Cement Based Materials.

Concrete is found everywhere, but it is one of the most difficult materials to describe and understand. It is composed of rocks of many different shapes and sizes, held together by cement paste. Its internal structure appears as diverse and complicated through the microscope as it does to the eye. This structure affects the ability of concrete to resist penetration by salt and to resist

“Being a postdoc at NISS was very useful because I was able to collaborate with researchers in other fields.”

deterioration. The NISS project sought to establish relationships between the composition of concrete, the internal structure of concrete specimens, and their resistance to infiltration by salt.

“Being a postdoc at NISS was very useful because I was able to collaborate with researchers in other

fields. I learned of the disconnect between the work of materials scientists and of statisticians, and found a field where there were multiple opportunities to apply spatial statistical methods. The application of statistics can speed progress towards solutions to complex scientific and engineering problems, while the data and models required have the potential to greatly enrich spatial statistics. The progress that can be made in working with scientists and engineers can have a synergetic effect on making advances in both fields,” commented Picka.

In one case encountered by Picka, the only method for predicting the strength of a new composite material was to break 1800 specimens, one at a time. Reliable models for the properties of disordered materials would be able to suggest compositions with good properties and to reduce the number of tests required.

After leaving NISS, Picka joined the mathematics department at the University of Maryland College Park. Later, he took a position at the University of New Brunswick – Fredericton, where he remains today. His current work is centered on developing methods for assessing the fit of models for powder flow, forest

fire evolution, and spontaneous pattern formation in physical, chemical, and biological systems. This research is inspired by his work at NISS.

“I would strongly recommend the NISS post-doctoral program to any students who are looking for a place to begin their careers. Working at NISS gave me the opportunity to



Former NISS postdoc Jeff Picka is at the U. of New Brunswick.

work with cutting edge researchers on problems that needed to be answered, but which could not be answered using existing statistical techniques,” said Picka.

Picka is an avid cyclist, and enjoys exploring the Northeast and Midwest to find old books on technologies of the past, as well as photogenic disused industrial sites and infrastructure.

Profile on NESSI Research Analyst: **Weiwei Cui**

Weiwei Cui has been breaking new ground for NISS. She is one of five NISS employees and postdoctoral fellows now based in the Washington DC region. Weiwei is a research analyst, working with the NAEP Education Statistics Services Institute's (NESSI) Division of Assessment. NISS partners with the American Institutes for Research (AIR) in operating NESSI. Weiwei is the second NISS employee to work in the NESSI offices full-time.

NAEP—the National Assessment of Educational Progress, also known as the Nation's Report Card, is the largest and most important educational assessment in the US. NAEP is a continuing and nationally representative measure of achievement in various subjects over time. It measures students performance in various disciplines including mathematics, reading, science, civics, U.S. history, and geography. Findings of NAEP help policymakers, educators and parents make decisions that ultimately improve the quality of education in the public school system.

Weiwei's responsibilities include reviewing draft reports that the National Center for Education Statistics (NCES) is producing,

before the reports are officially published. She reviews the overall technical validity and processes that



Weiwei Cui is a research analyst for NISS working with NESSI.

were used in the NCES publications to ensure that a very diverse set of readers can understand the information. She evaluates the reports to see that the appropriate statistical procedures are being used to support the results reported in the publications.

"I am very happy here," remarks Weiwei, "I have the opportunity to work on special projects in addition to reviewing the reports and publications. I also consult a little bit with some of the other research teams on statistical and measurement issues."

Weiwei graduated from the University of Maryland in 2008. She started with NISS in July of 2008.

"I am very appreciative of all that Alan Karr has done for me. I have a lot of flexibility to work on research papers in addition to my review work. I presented my research works at three national conferences last year and will present my research works at two national conferences this year. I couldn't have done that without Alan's help. I have always felt very supported by him. He

Weiwei is one of five NISS employees and postdoctoral fellows now based in the Washington DC region.

is very patient and always talks to me whenever I need some advice. He has made it easy to work outside of the NISS headquarters and has made me feel very included."

When she is not at NISS, Weiwei loves to spend time with her daughter, Ally. She also likes to garden.

Project TALENT Follow Up

Takes a Close Look at the Baby Boomer Generation

Take yourself back to 1960. Despite the Cold War, it was a time of optimism in the United States. Our economy was booming, the industrial age was at its peak and we expected to continue our growth and prosperity. Civil rights and the Viet Nam war were still in the future.

In the spring of 1960, the University of Pittsburgh, funded by what was then called the U.S. Department of Health, Education and Welfare, embarked on a large-scale survey called “Project TALENT.” The intention was to survey high school students from around the country, to measure each person’s aptitudes and inclinations, in order to discover what talent he or she might possess. Nearly 400,000 students in 1,000 schools participated, many of whom were re-contacted 1, 5 and 11 years following completion of high school.

Project TALENT was one of “the first scientifically planned national inventory of human talents: the aptitudes and abilities of a people,” according to a report about the project that was published in November 1959. It is also the source of cognitive questions still used today, as well as the stimulus for development of electronic test-scoring machines. The survey was immense, requiring two full days of student time. The background questionnaire had 394 questions ranging over interests in occupations and activities, personality traits,

demographic information, family background, health, current activities in and outside of school, educational experience, and career, military and family plans. The survey also measured aptitudes in language, mathematics, abstract and mechanical reasoning, creative thinking, clerical and perceptual processing and spatial visualization.

Fifty years later, there is now a chance to learn what happened to those who participated in the



survey. The American Institutes for Research (AIR), which owns the original data, has decided it is time to follow up with as many people as possible who participated in Project TALENT. NISS is a partner in this effort. Ultimately, many more organizations will be involved.

“AIR has recovered the data from nine-track tapes, and we are working together to understand both what’s in the data and what the problems are with the data. Some files are still incomprehensible to us,” said Alan Karr, director of NISS. “As we move forward, we will face a myriad of interesting statistical challenges, including survey weights and design new

data collections. Project TALENT is literally a once-in-a-lifetime opportunity to learn about everything from health to education to career trajectories.”

To read more about Project TALENT, go to its website: www.projecttalent.org or go to NISS’ website and look under research for Project TALENT.

Some Sample Questions from the Original Survey

Which of these would probably shrink the most in hot water?

- A. Nylon hose
- B. Wool sweater
- C. Cotton broadcloth shirt
- D. Dacron suit
- E. Linen dress

Which of these is a type of corn?

- A. Frontier
- B. Stuart
- C. Century
- D. Ruston
- E. DeKalb

How many flats has the key of E Flat Major?

- A. 1
- B. 2
- C. 3
- D. 4
- E. 0

NISS History (Continued)

(From page 1)

than even today. This original project was funded by NCES and NSF.

The original proposal to locate NISS in Research Triangle Park included a promise from the Triangle Universities Center for Advanced Studies, Inc. (TUCASI) of land on its Research Triangle Park campus, and from the North Carolina General Assembly for matching funds to help NISS construct a \$5 million building. However, when the country fell into a recession in the early 1990's and the state's budget was in a shortfall, the appropriation was removed from the budget.

After many conversations and diligent work by Sacks, Daniel Horvitz, Karr and many others, the legislature approved \$2.5 million for construction of the building. The design was completed by O'Brien/Atkins in 1996. Construction of the building began in 1997 and the building was dedicated in November of the same year, with North Carolina Lt. Governor Dennis Wicker as the keynote speaker. In 2005, O'Brien/Atkins won the design award from the North Carolina chapter of the American Institute of Architects for its design of the NISS building.

"I think the building has always been really important for our visibility, by giving the community a concrete existence for NISS and an associated sense of tangibility and permanence," said Karr.

Research at NISS also continued to grow. A new research area opened in 1996, partnering with Lucent Technologies with the software engineering project, **Code Decay in Legacy Software Systems: Measurements, Models and Statistical Strategies**. NISS continued to expand its intellectual horizons, collaborating with Los

Alamos National Laboratory in 1998 on the TRANSIMS activity-travel project: **Statistically Based Activity Generation**, funded by the US Federal Highway Administration. The Digital Government project began in 1999 called **A Web-Based Query System for Disclosure-Limited Statistical Analysis of Confidential Data**, initiating a data confidentiality research presence for NISS that remains potent today.

In the summer of 1999, Jerry Sacks decided it was time to retire and to give the reins over to a new director. In the next issue of *NISS Parameters*, we'll discuss how NISS continued to grow and prosper under new leadership.



Former Lt. Governor Dennis Wicker makes the keynote speech at the dedication for the NISS building in 1997.

Nominations Solicited for 2010 Jerome Sacks Award

The NISS Board of Trustees established the Jerome Sacks Award for Cross-Disciplinary Research in 2000 to honor Sacks' service as the founding director of NISS. The annual prize of \$1,000, to be presented this year at the NISS/SAMSI Joint Statistical Meetings Reception in Vancouver, British Columbia, recognizes high-quality cross-disciplinary research involving the statistical sciences.

The 2010 award selection committee solicits nominations of researchers whose work is cross-disciplinary, sustained and encompasses innovation in the statistical sciences. Preference will be given to work that, in the spirit of NISS, creates new research relationships bridging the statistical sciences and other disciplines. Achievements such as patents and software creation will be considered.

Nomination letters (no supporting materials are necessary) should be submitted by **June 1, 2010** to sacksaward2010@niss.org.

@NISSAMSI Wins NCPRSA 2010 InSpire Award for Social Media

NISS and SAMSI have been awarded the North Carolina Public Relations Society of America (NCPRSA) InSpire Bronze Best of Category Award for the Social Media category.

The NCPRSA Bronze InSpire Awards acknowledge exceptional public relations achievements as well as the individual components of campaigns.

NISS and SAMSI have built up a following of 566 followers, most of whom are statisticians and applied mathematicians on the @NISSAMSI Twitter account. NISS and SAMSI use Twitter to promote research projects, papers reporting the research, workshops and events, as well as other information of interest to the target audience. "We have been amazed at the amount of response we have received from our Twitter account," remarks Jamie Nunnally, director of communications for NISS and SAMSI. "At We Follow.com, @NISSAMSI is now rated as the #1 most influential Twitter account for statistics."

P.O. Box 14006
19 T.W. Alexander Drive
Research Triangle Park, NC 27709
919.685.9300 (phone) 919.685.9310 (fax)
www.niss.org

NISS/SAMSI Affiliates

Industry

AT&T Labs-Research, Florham Park, NJ
Avaya Labs, Basking Ridge, NJ
Bayer HealthCare Pharmaceuticals, West Haven, CT
GlaxoSmithKline, Research Triangle Park, NC and Collegeville, PA
Merck Research Laboratories, West Point, PA
MetaMetrics, Inc., Durham, NC
PNYLAB, LLC, Princeton, NJ
RTI International, Research Triangle Park, NC
SAS Institute, Cary, NC
SPSS, an IBM Company, Chicago, IL
Telecordia Technologies, Piscataway, NJ
Yahoo! Research Laboratory, Silicon Valley, CA

Government Agencies & National Laboratories

Bureau of Labor Statistics, Washington, DC
US Census Bureau, Washington, DC
Energy Information Administration, Washington, DC
National Agricultural Statistics Service, Fairfax, VA
National Center for Education Statistics, Washington, DC
National Center for Health Statistics, Hyattsville, MD
National Security Agency, Ft. George W. Meade, MD
Office of the Comptroller of the Currency (Treasury Department), Washington, DC

University

University of California - Berkeley, Department of Statistics
Carnegie Mellon University, Department of Statistics
Columbia University, Department of Biostatistics
University of Connecticut, Department of Statistics
Duke University, Departments of Statistical Science and Mathematics
Duke University Medical Center; Department of Biostatistics and Informatics
Emory University, Department of Biostatistics
University of Florida, Department of Statistics
Florida State University, Department of Statistics
George Mason University, Department of Statistics
Georgetown University Medical Center, Department of Biostatistics, Bioinformatics, and Biomathematics
University of Georgia, Department of Statistics
University of Illinois Urbana-Champaign, Department of Statistics
Indiana University, Department of Statistics
Iowa State University, Department of Statistics
Johns Hopkins University, Department of Applied Mathematics and Statistics
Medical University of South Carolina,

Department of Biostatistics, Bioinformatics and Epidemiology
University of Michigan, Departments of Statistics and Biostatistics
University of Missouri-Columbia, Department of Statistics
North Carolina State University, Department of Statistics
North Carolina State University, Department of Mathematics
University of North Carolina at Chapel Hill, Department of Statistics and Operations Research
University of North Carolina at Chapel Hill, Department of Biostatistics
University of North Carolina at Chapel Hill, Department of Mathematics
Oakland University, Department of Mathematics and Statistics
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Rutgers University, Department of Statistics
University of South Carolina, Department of Statistics
Southern Methodist University, Department of Statistical Science
Stanford University, Department of Statistics
Texas A&M University, Department of Statistics
Virginia Commonwealth University, Departments of Biostatistics and Statistical Sciences